ball **62** on one end which fits into the socket aperture **68** of the channel **72**.

Assembled directly on top of the upper surface **58** of the housing **70**, positioned for bidirectional movement along the central axis **76**, is the interleaved driven plate **66** having an elongated slot **56**. On top of the driven plate **66** is the driver plate **64** with a frustoconical countersink bore **59**. The joystick **60** passes through the slot **56** and the bore **59**, and may be fitted with a handle **78** for grasping the joystick **60**.

With additional reference to FIGS. **4** and **5**, the operation of the unidimensional Couette flow apparatus is illustrated. The handle **78** of joystick **60** is grasped and pivoted back and forth along central axis **76** (FIG. **6**), between the driving plate **64** and the interleaved driven plate **66** is a layer of relatively low viscosity Newtonian fluid **74** (preferably a grease to avoid escaping and loss of lubricant). Movement of the driving plate **64** will cause movement of the driven plate **66**. However, driven plate **66** has an under-coating of a high viscosity grease **77**, contained between the driven plate and the housing **70**, so that as motion of the driver plate **64** gives rise to motion of the driven plate **66**, the distance traversed by the driven plate **66** will be substantially less than the axial distance traversed by plate **64** as a result of the drag effect of the high viscosity grease. In this manner motion reduction may be achieved, due to the difference in viscosities of the fluids **74** and **77** and the Couette flow effect. Use of a pivot ball **62** and socket **68** reduces any frictional drag that the arm **60** may exhibit, so that the Couette flow effect may be maximized and a linear motion reduction may be achieved which is substantially a function of the viscosities of the fluids ratio.

A top perspective view, two cross-sectional views, and a two dimensional embodiment of a Couette flow motion reduction apparatus (FIGS. **7-10**), together, show a joystick **80** which is supported by a double bearing assembly **82** having an upper contact sphere **84** integral with the lower contact sphere **86**. The double bearing assembly **82** (integral with the joystick **80**) forms a lubricated lever allowing 360° freedom of movement of the joystick around circular path **88** (FIGS. **8** and **9**).

Into the stationary upper housing plate **90**, a conical aperture **92** is formed in the preferred embodiment. The upper housing plate serves as a retainer for the driver plate **100** which contains an aperture for the double bearing assembly **82** which operates as a ball joint. Fluid layer **94** is of a viscosity equal to fluid layer **96**, so that as the joystick **80** is moved in either an X or Y direction, (or diagonally to these axes) both contact spheres **84** and **86** will be continually lubricated by the same fluid. A counter sink bore **98** is sculptured into movable circular driver plate **100**, so that as the joystick **80** is rotated or swivelled, the circular driver plate **100** causes movement of the driven plate **104**. By means of the Couette flow principles, the fluid layer **106**, (being a higher viscosity fluid than fluid layers **94** and **96**) when interacting with driven plate **104**, causes reduced displacement of the plate **104**. A lower housing **108** remains stationary supporting the whole assembly. An adjusting screw **110** is used to lock the lower ball of the double bearing assembly into the stationary housing, preventing the unintended uplifting or movement of assembly **82**.

With particular reference to FIGS. **7** and **10**, the movable parts of the two dimensional Couette flow apparatus are shown in an exploded assembly configuration at FIG. **10**. The driven plate **104** has a large central hole **99** which may be positioned in line with the counter sink bore **98** of the circular driver plate **100** in order to insert the joystick **80** therethrough. The bore **98** is substantially smaller in diameter than the hole **99** of the driven plate **104**, and matches the diameter of sphere **84** so that the circular driver plate **100** has a wide range of movement available, as shown by the alternate broken circular paths **103** of FIG. **7**. As the plate **100** moves over the range of paths **103**, the contact sphere **84** may move all along the inner circumference of the circular path defined by hole **99** (see FIG. **7**). The assembly configuration of Figure **10** additionally reveals that the double bearing assembly **82** has a short length **112** of the joystick **80** which separates the contact spheres **84** and **86**, allowing the freedom of range of movement within hole **99** which the joystick **80** enjoys.

Reduction of motion is achieved as revealed in FIGS. **8** and **9**. As one grasps the handle ball **114** of the joystick **80** and revolves the stick about the circular path **88**, the sphere **84** and driver plate **100** moving against the inclined sides of bore **98**, act together as a movable point of application of effort for the joystick **80** against the plate **100**. Contact sphere **86** acts as a fulcrum for the assembly **82** to redirect the movement applied at the handle ball **114** to effort against the load driver plate **100**. As previously noted, the grease fluid layers **94** and **96** remain the same lower viscosity, while the grease of fluid layer **106** is a higher viscosity so that the principles of Couette flow reduction be applied to the two dimensional apparatus. In this manner, a large movement of the plate **100** induces a reduced motion to the driven plate **104**. The distances which the plates **104** and **100** traverse remain linearly proportional provided the ratio of viscosities of fluid layer **106** and layer **96** remain constant due to the Newtonian nature of the fluids which lie between the two plates **104** and **100** and points at which either plate **104** and **100** lie against the housing **90**.

Taken together, FIGS. **7-9** illustrate the manner in which a reduction of motion of the driven plate **100** may be achieved.

While the preferred embodiment of the invention is disclosed herein, scope of the invention is not necessarily limited to the preferred embodiment. Many changes are possible and these changes are intended to be in the scope of the disclosure. For example, two sets of plates as shown in FIGS. **4** or **8** may exhibit a similar effect as hereinbefore described when the fluids separating the plates are of the same viscosity, but the spacing between the plates is not the same, such as the diagramatic profile shown in FIG. **2**. Consequently, the specific configuration of the disclosed preferred embodiment herein and the construction of the apparatus of this system are merely representative, yet are deemed to afford the best embodiment for purposes of the disclosure and for providing support to the claims which define the scope of the present invention.

What is claimed is:

1. A fluid flow motion reduction apparatus, comprising:

at least three plates including a top movable plate, a bottom stationary plate, and an interleaved driven plate positioned between the top plate and the bottom plate;

a first fluid positioned between said top movable plate and said interleaved driven plate;